



# The Marshall Star

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## Celebrate Orion's First Test Flight, Enjoy Holiday Tree Lighting Dec. 4

By Megan Davidson

NASA's Orion spacecraft is on the launchpad and ready to start the countdown to its first test flight Dec. 4. Team Redstone -- which includes NASA's Marshall Space Flight Center and U.S. Army organizations on Redstone Arsenal -- are invited to participate in several events in celebration of that major milestone, and kick off the holiday season with the annual tree-lighting ceremony.

See Orion Launch Activities on [page 2](#)



Artist concept of Orion's first flight test, scheduled for Dec. 4. (NASA)

## Multi-Center NASA Social to Follow Orion's First Flight Activities

For the first time ever, all 10 NASA field centers will participate in a multi-center NASA Social event Dec. 3, previewing the Dec. 4 first flight of [NASA's Orion spacecraft](#).

NASA's Marshall Space Flight Center is inviting social media users from all over to get a unique, behind-the-scenes look at the diverse work at NASA centers across the country.

Along with discussing Orion

See NASA Social on [page 2](#)



## Orion Launch Activities *Continued from page 1*

“A lot of hard work has gone into this flight by the Marshall Center team,” said Space Launch System Program Manager Todd May. “Tomorrow not only will be a proud and exciting day for all those involved in that work, but also because this is the first step in getting Orion ready to launch on SLS and furthering NASA’s mission of going to deep space.”

SLS, NASA’s new rocket, will be the most powerful rocket ever built for those deep space missions, including to an asteroid and ultimately Mars. The Marshall Center manages the SLS Program for the agency.

For its test flight, Orion will launch atop a Delta IV Heavy rocket from Cape Canaveral Air Force Station’s Space Launch Complex 37. The flight test will evaluate launch and high-speed re-entry systems such as avionics, attitude control, parachutes and the heat shield. During its two-orbit, 4.5-hour flight, Orion will venture 3,600 miles in altitude and travel nearly 60,000 miles before returning to Earth for a splashdown in the Pacific Ocean.

### Rundown of Celebration Events

- Starting at 5 a.m. Dec. 4, the U.S. Space & Rocket Center will provide live coverage of the launch -- scheduled for 6:05 a.m. -- in the Davidson Center for Space Exploration Digital Theater. The launch window extends to 8:44 a.m. Educational activities for kids and breakfast also will start at 5 a.m. and end shortly before splashdown, which is scheduled

for 10:29 a.m. if launch occurs at the start of the window. Marshall representatives will be on hand to provide brief remarks and answer questions about the launch. The event is free, but breakfast will be available for purchase. Guests also will receive a complimentary VIP launch pass lanyard. Marshall team members are encouraged to wear NASA apparel and take pictures of themselves to post to the Marshall social media accounts using the hashtags #orion and #nasasocial.

- Marshall Center senior leadership will host the Orion Splashdown Party at 11 a.m. in the Building 4203 cafeteria. Monitors will show NASA TV coverage of the Orion splashdown. The Army Materiel Command Band will provide entertainment, and light refreshments will be served.
- The Marshall Exchange will host the annual holiday tree-lighting ceremony at 4:45 p.m. on the front lawn of Building 4200. Santa Claus will make an appearance, and children from the Marshall Child Development Center will sing seasonal songs. Cookies and hot chocolate will be provided.

For more information on Marshall and North Alabama’s contributions to Orion’s first flight, click [here](#).

*Davidson, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.*

## NASA Social *Continued from page 1*

and [NASA’s Journey to Mars](#), participants will experience the Marshall Center through tours and presentations with scientists, engineers and NASA managers. Each center will be connected to NASA’s Kennedy Space Center via a multi-center NASA Television simulcast during its social.

Marshall team members and the public can follow the Marshall NASA Social on our social accounts: Twitter - [@NASA\\_Marshall](#), [Facebook](#) and [Instagram](#).

Updates and information about launch activities and all NASA Social events will be shared on the main NASA and Orion accounts: Twitter ([@NASA](#), [@NASASocial](#), [@NASA\\_Orion](#)), Facebook ([NASA](#), [NASA’s Orion Spacecraft](#)), and Google+ ([NASA](#)).

# Connecting the Pieces for Orion's First Flight

By Megan Davidson

In 2012, NASA Marshall Space Flight Center team members began work on an important piece of hardware for Orion's first flight test. The stage adapter is the connection between the Orion spacecraft and the United Launch Alliance Delta IV Heavy rocket. Two years after that first cut of metal, the three were stacked Nov. 12 and are being readied for that Dec. 4 flight at Cape Canaveral Air Force Station Space Launch Complex 37 in Florida.

Here's a pictorial look back at the adapter work at the center in preparation for Orion's 3,600-mile journey to space.

## June 2012



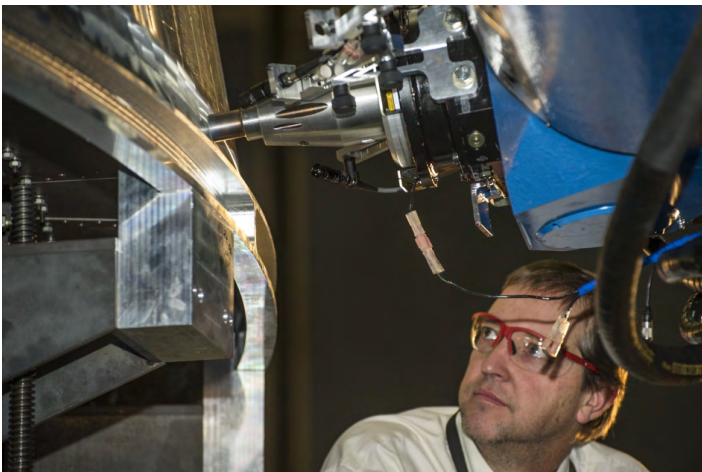
A state-of-the-art milling tool is used to create the pathfinder version of the adapter hardware design at NASA's Marshall Space Flight Center. The term "pathfinder" refers to an early version of the hardware that is not intended to fly, but to prove the concept and feasibility of manufacturing the design. (NASA/MSFC/Emmett Given)

## October 2012



Pathfinder adapter hardware nears completion as engineers use a state-of-the-art vertical welding tool to move it for the finishing touches at the Marshall Center. (NASA/MSFC/Emmett Given)

## November 2012



A Marshall Center welding technician conducts the first circumferential weld of the pathfinder version of the adapter design. (NASA/MSFC/Emmett Given)

## December 2012



Marshall Center engineers receive materials to begin manufacturing the flight adapter. (NASA/MSFC/Ray Downward)

See *Connecting the Pieces* on [page 4](#)

## May 2013



*The pathfinder adapter is flipped at Marshall testing facility Building 4705. The turnover is an important step in finishing the machining work on the hardware. (NASA/MSFC)*

## June 2013



*The adapter and a United Launch Alliance Delta IV test article were successfully connected during a fit check at the Marshall Center. (NASA/MSFC/Fred Deaton)*

## September 2013



*Orion's stage adapter diaphragm was delivered from a manufacturing facility at Janicki Industries in Hamilton, Washington, to the Marshall Center. The diaphragm will be used to keep launch vehicle gases away from the Orion spacecraft during its test flight. (NASA/MSFC)*

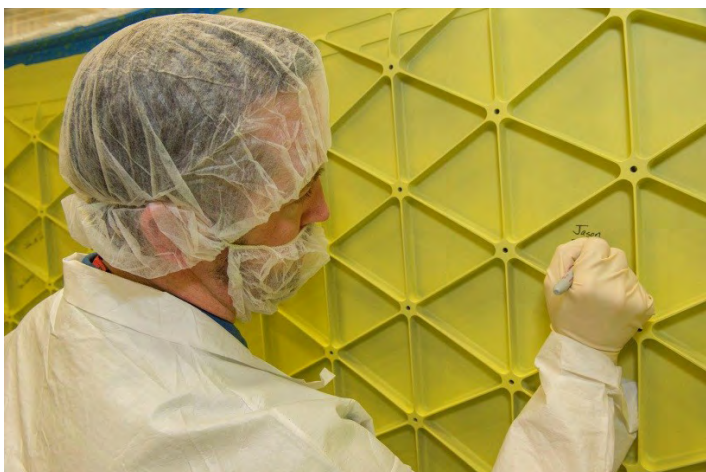
## November 2013



*The adapter diaphragm was joined to an adapter prototype for pressurized testing at the Marshall Center. For the test, the adapter was sealed, and a vacuum pump was connected to the diaphragm. The vacuum pressure simulates atmospheric conditions the hardware may experience during the mission. (NASA/MSFC/Dee Vancleave)*

*See **Connecting the Pieces** on [page 5](#)*

## December 2013



Jason Eldridge, an ERC Inc. employee supporting the Materials & Processes Laboratory at the Marshall Center, signs his name on the interior of the adapter. Marshall Center team members who were involved in the design, construction and testing of the adapter had the opportunity to autograph it before the hardware is shipped to NASA's Kennedy Space Center. (NASA/MSFC/Fred Deaton)

## January 2014



A test article of the stage adapter aced structural loads testing at the Marshall Center's East Test Area. (NASA/MSFC/David Olive)

## January 2014



Marshall team members involved in the adapter work celebrated its completion in Building 4708. (NASA/MSFC/Emmett Given)

## April 2014



The adapter is loaded onto a truck at the Marshall Center and delivered to United Launch Alliance in Decatur. (NASA/MSFC/Brent Gaddes)

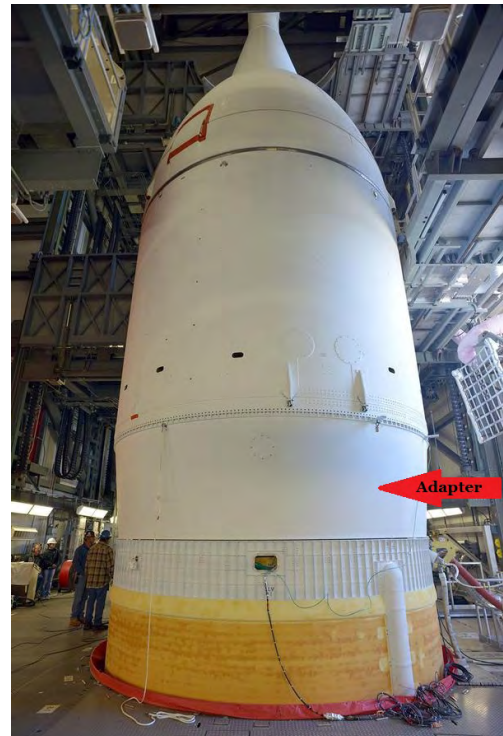
*See Connecting the Pieces on page 6*

**May 2014**



*The stage adapter arrived by barge at Cape Canaveral, Florida, from United Launch Alliance. (NASA/KSC)*

**November 2014**



*The adapter connects the Orion to the Delta IV on Nov. 12 at Space Launch Complex 37 in Florida. The spacecraft will be fully connected to the rocket and powered on for final testing and preparations in the weeks leading up to launch. The same adapter technology will connect the Orion to NASA's Space Launch System -- the most powerful rocket ever built for deep space missions. The Marshall Center manages the SLS Program for the agency. (NASA/KSC)*

## 'Tis the Giving Season for Marshall Team Members

On Nov. 26, dozens of team members from [NASA's Marshall Space Flight Center](#) volunteered during the annual Great Thanksgiving Banquet, sponsored by the Downtown Rescue Mission in Huntsville. The Rescue Mission -- a nonprofit organization serving area homeless -- is one of the local charities that receive funding from contributions to the Combined Federal Campaign. Todd May, above right, manager of NASA's [Space Launch System](#), was among the Marshall volunteers who helped serve the Thanksgiving dinner, which provided hundreds of meals and turkey boxes to those in need. (NASA/MSFC/Emmett Given)



## First 3-D Printed Space Part Featured on 'This Week @NASA'

The first 3-D printed part in space was featured in the latest edition of "[This Week @NASA](#)," a weekly video program broadcast nationwide on NASA-TV and posted online.

On Nov. 24, ground controllers at [NASA's Marshall Space Flight Center](#) uploaded instructions for the printer to make a spare faceplate for itself. The printer was tested at the Marshall Center and recently installed on the [International Space Station](#). 3-D printing is monitored from the Marshall Center's Payload Operations Integration Center, a facility supporting on-orbit science investigations.

The 3-D printer is part of the [3-D Printing in Zero-G Technology Demonstration](#), aiming to demonstrate the feasibility of printing spare parts and tools on long duration missions. The printer uses a process formally known as additive



manufacturing to heat plastic filament and extrude it one layer at a time to build parts.

This and previous episodes can be viewed at [www.youtube.com/user/NASAtlevision](http://www.youtube.com/user/NASAtlevision).